

No Calculators

① Sketch a graph of the following functions:

② $f(x) = (x+2)(x)^3$

③ $f(x) = -\frac{1}{4}(x)^2(x+\sqrt{12})(x-\sqrt{12})$

② Find the vertex and zeros of $y = 3x^2 + 10x - 8$

③ Factor

④ $2x^4 + 2x^2 - 12$

$2(x^4 + x^2 - 6)$

Similar to $2x^2 + 2x - 12$

$(2x+6)(x-2)$

$(2x-4)(x+3)$

$2(x+3)(x-2)$

$(2x^2+6)(x^2-2)$

$(2x^2-4)(x^2+3)$

$2(x^2+3)(x^2-2)$

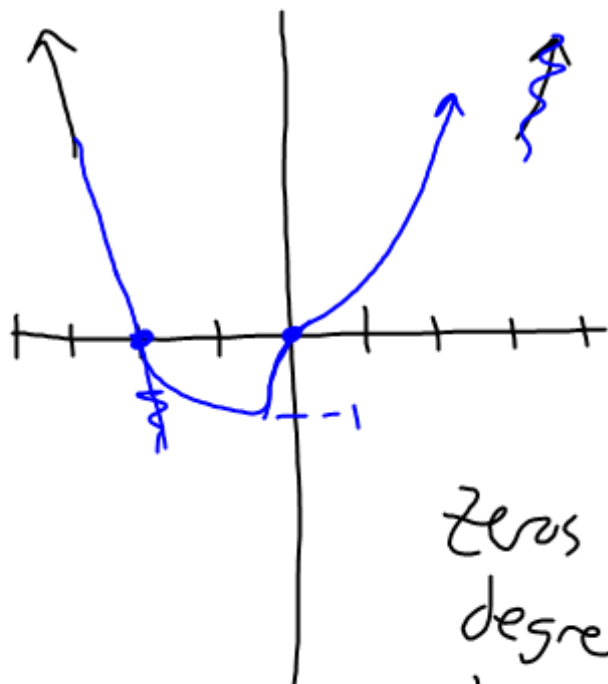
⑤ $x^3 + 2x^2 + x$ $x^3 + 2x + x$

$x(x^2 + 2x + 1)$ $x(x^2 + 3)$

$(x)(x+1)(x+1)$

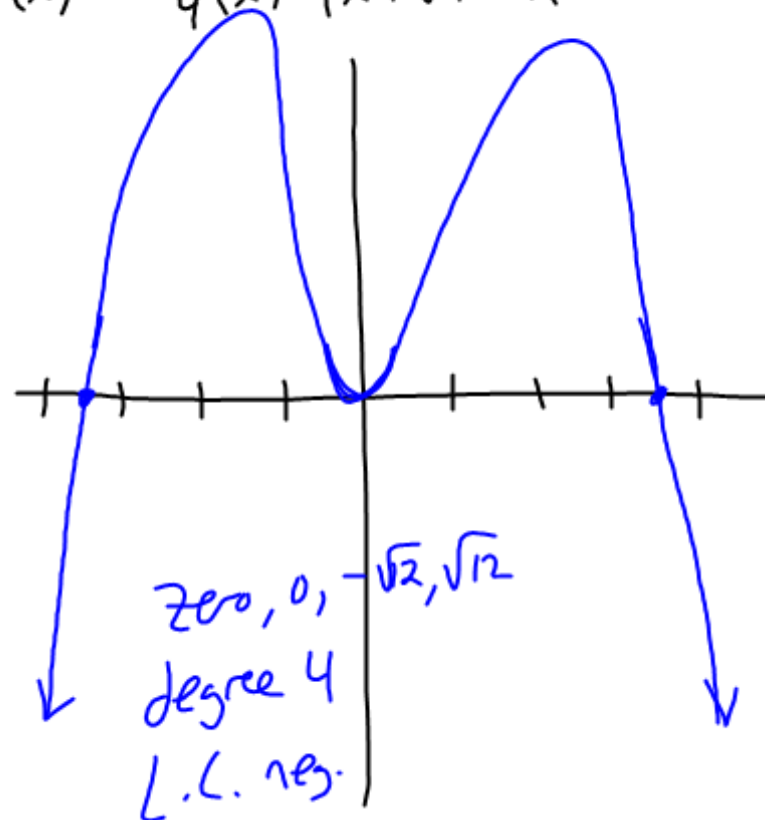
① Sketch a graph of the following functions:

① $f(x) = (x+2)(x)^3$



zeros $-2, 0$
degree 4
L.C. positive

② $f(x) = -\frac{1}{4}(x)^2(x+\sqrt{12})(x-\sqrt{12})$



zeros $0, -\sqrt{12}, \sqrt{12}$
degree 4
L.C. neg.

$$y = 3x^2 + 10x - 8$$

$\begin{array}{cc} 1.3 & 1.8 \\ & 2.4 \end{array}$

$$(3x - 2)(x + 4) = 0$$

$$\text{zeros: } -4, \frac{2}{3}$$

$$\text{vertex: } -\frac{10}{2(3)} = -\frac{5}{3} \quad -\frac{b}{2a}$$

$$y = 3\left(-\frac{5}{3}\right)^2 + 10\left(-\frac{5}{3}\right) - 8 = -16.\overline{33}$$

$$914 \div 8$$

$$\begin{array}{r} 114 \frac{2}{8} \\ 8 \overline{) 914} \\ \underline{-8} \\ 11 \\ \underline{-8} \\ 34 \\ \underline{-32} \\ 2 \end{array}$$

$$\begin{array}{r} 76 \frac{6}{8} \\ 8 \overline{) 614} \\ \underline{-56} \\ 54 \\ \underline{-48} \\ 6 \end{array}$$

Division

- get factors
- may lead to zeros
- put in place holders

Synthetic division

- only linear factors with 1 as the L.C.
- placeholders

Remainder Thm.

$$\begin{array}{r} x^2 + x + 4 + \frac{16}{x-3} \\ \underline{x-3} \overline{) \underline{x^3 - 2x^2 + x + 4}} \end{array}$$

$$- \underline{x^3 - 3x^2}$$

$$x^2 + x$$

$$\underline{x^2 - 3x}$$

$$4x + 4$$

$$\underline{4x - 12}$$

$$16$$

$$\frac{\cancel{x^2}}{\cancel{x}}$$

$$\frac{x^3 - 1}{x - 1}$$

$$\begin{array}{r}
 x^2 + x + 1 \\
 x-1 \overline{) x^3 + 0x^2 + 0x - 1} \\
 \underline{x^3 - 1x^2} \\
 x^2 + 0x \\
 \underline{x^2 - x} \\
 x - 1 \\
 \underline{x - 1} \\
 0
 \end{array}$$

$$(x-1)(x^2+x+1)$$

$$\begin{array}{r}
 2x^2 + 8x + 17 + \frac{61x+49}{x^2-2x-3} \\
 x^2 - 2x - 3 \overline{) 2x^4 + 4x^3 - 5x^2 + 3x - 2} \\
 \underline{2x^4 - 4x^3 - 6x^2} \downarrow \\
 8x^3 + x^2 + 3x \\
 \underline{8x^3 - 16x^2 - 24x} \downarrow \\
 17x^2 + 27x - 2 \\
 \underline{17x^2 - 34x - 51} \\
 61x + 49
 \end{array}$$

Sect. 2.3

1-12 (7)